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ANALYSIS OF MAGSAT DATA OF THE INDIAN REGION - LR-149500

PROGRESS REPORT FOR THE PERIOD 2-2-82 TO 31-5-82

AUTHORS NAME: i) MAJ.GEN. G.C. AGARWAL
ii) COL.(DR.)M.G. ARUR

ORGANISATION: SURVEY OF INDIA
GEODETIC & RESEARCH BRANCH
17 E.C. ROAD, DEHRA DUN
PIN-248001
INDIA.

REPORTING DATE: JUNE 30, 1982

REPORT NO: 4

I. INVESTIGATION TEAM:

During the period under report the investigation team consisted of the following members:-

1. Maj.Gen. G.C.Agarwal, Col.(Dr.)M.G.Arur, Mr. R.M.Gupta, Mr. P.S. Bains and Mr.Jeevan Lal of Survey of India.
2. Dr. J.G. Negi and Dr. P.K.Agarwal of N.G.R.I.
3. B.N.P.Agarwal of Department of Science and Technology.
4. Dr. Baldev Sahai of Space Application Centre, Ahmedabad.

II. SUMMARY:

1. ACTIVITIES BY SURVEY OF INDIA.

(a) The Major activities of the period were:

i) To prepare data tapes for supply to N.G.R.I. which is one of the co-investigators.

ii) Reduction of data of satellite tracks over the Indian Region to a common elevation.

(b) Two magnetic data Tapes were read and reduced to common elevation and the print of the third data tape has been obtained for reduction.

(E83-10027) ANALYSIS OF MAGSAT DATA OF THE INDIAN REGION Progress Report, 2 Feb. - 31 May 1982 (Survey of India) 4 p
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G3/43 00027

(c) Anomalies if 24 satellite tracks have been computed for 'Z'element of Geomagnetic field. It is seen that the resulting anomalies vary from negative value over the Himalayan region to positive value over the deccan trak area. The anomalies again turn negative over the ocean areas.

2. ACTIVITIES BY NATIONAL GEOPHYSICAL RESEARCH INSTITUTE.

Various parameters of the Magsat data from Magsat Investigator tape-B(No:00 Supplied to N.G.R.I.) pertaining to Indian sub continent were sorted out by them and tabulated systematically.

The profiles of raw scalar and vector field data and the residuals for few passes were prepared. Two additional tapes (Nos 11 & 12) supplied to N.G.R.I. have been decoded.

3. ACTIVITIES BY SPACE APPLICATION CENTRE AHMEDABAD.

Investigator B tape has been decoded. Anomaly data set was created for the range 16°N-26°N latitude and 70°E-82°E longitude.

The anomally data at Common elevation was sampled on a 0.5° x0.5° grid and the mean anomally was calculated.

III. ACCOMPLISHMENTS AND DISCUSSIONS ON INVESTIGATIONS.

1. By Survey of India.

As mentioned in para II above all the three investigator tapes have been decoded.

The anomalies of the 24 satellite tracks were computed by substracting the model values as given in the data for Z element of the geomagnetic field for finally preparing an anomally map. In an effort to seperate out the anomalies of the crustal origin in the 'Z' element linear regression equation was fitted after applying Ring correction as given in NASA Technical Memorandum No.82160 for both external and internal origin. The resulting anomalies of all the tracks over the Himalayan Region have been found to be predominantly negative. Positive anomalies prevail over the deccan trap areas and again anomalies turn negative in the Indian Ocean. The dividing line of the positive and negative anomalies between the Himalayas and Deccan traps is the Narmada Lineament.

.....3

2. By National Geophysical Research Institute:

As mentioned in para II above the Magsat data from Magsat Investigator tape B(No.00 supplied to N.G.R.I) pertaining to Indian Sub-continent has been sorted out and tabulated systematically. The two additional magnetic tapes(Nos 11 & 12) have been decoded and data is being plotted.

The profiles of raw scalar and vector field data and the residuals obtained by substracting the magnetic field predicted from model along few passes were prepared. The profiles show a linear increase of the field with latitude which is expected at this altitude range(400-500km) as the field is dominated by the core field of the earth. The residual profiles which are still contaminated with the effects of external sources range between -10 and -20 gammas as was found earlier in the pass 39. The residual anomaly repeats itself at short intervals of space. The cause for such repetition is not yet known.

3. By Space Application Centre Ahemadabad.

As mentioned in para II decoding of investigator-B tape was accomplished by SAC using Assembler Read-Write routine.

Anomally data set was created by taking difference of Z components of measured magnetic field and the magnetic field predicted by model for the area within the range 16°N 26°N latitude and 70°E-82°E longitude. An attempt was made to continue upward/downward this input data set to an elevation of 386 km above the earth using 'UPCON' programme. Results obtained seem to be satisfactory.

Having obtained anomaly data at common elevation, output data was sampled on a 0.5°x 0.5° grid. Mean was calculated of the values falling in a given grid. This value corresponds to the centre co-ordinate of that particular square.

.....4

IV. SIGNIFICANT RESULTS.

1. SURVEY OF INDIA.

All the three data tapes have been decoded and 24 tracks over the Indian Region have been reduced to common elevation.

2. N.G.R.I.

On data tape has been decoded. Profiles of raw scalar and vector field data and the residuals along few passes were prepared. The two additional data tapes have also been decoded.

3. S.A.C.

Investigator-B tape has been decoded and anomaly data set has been created and sampled on a 0.5°x 0.5° grid.

V. REPORTS SUBMITTED EARLIER:

1. Status Report of Magsat project by Survey of India sent on 1.6.81.
2. Second and third(combined)report sent on 19.4.82
3. This is the 4th report about the progress of magsat investigation.

VI. PROBLEMS:

It would be very much appreciated if a Computer programme for reducing the geomagnetic field observed values at satellite heights to ground level be sent to us.

VII. DATA QUALITY AND DELIVERY.

The quality of data supplied by Magsat mission is quite good and delivery is regular.

VIII. RECOMMENDATION:

Nothing for the present.

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*Virendra/